Periodic Processes

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Handbook and Manual pages

- Official guide and be found at
  - https://www.freebsd.org/doc/en/books/handbook/configtuning-cron.html
  - https://www.freebsd.org/doc/zh_TW/books/handbook/configtuning-cron.html

CRON – Schedule Commands (1)

- What we want?
  - Do things at right time automatically
- cron daemon
  - The daemon that handles periodic execution
  - cron daemon reads configuration file and executes commands on time

cron(8), crontab(1), crontab(5)

CRON – Schedule Commands (2)

- Configuration file
  - So called: crontab (cron table)
  - Location of user cron configuration file
    - Every user can have at most one crontab file and this file will be named the user's login ID
    - Edit using crontab(1) command

System	Cron Dir
FreeBSD	/var/cron/tabs
Red Hat	/var/spool/cron
Solaris	/var/spool/cron/crontabs
SunOS	/var/spool/cron/crontabs

  - Location of System Cron Configuration file
    - /etc/crontab

CRON – Schedule Commands (3)

- Configuration File Format
  - Ignored
    - Blank lines or leading spaces and tabs
  - Comments
    - pound-sign lines whose first non-space character is a #
  - environment setting
    - name = value
    - Default environment variables
      - LOGNAME, SHELL, PATH, HOME, MAILTO

```
SHELL=/bin/sh
PATH=/etc:/bin:/sbin:/usr/bin:/usr/sbin:/usr/local/bin
```

  - cron command example:

```
# minute hour day month weekday command
  33     7    *    *       *        /usr/local/bin/rsync -al -delete /home/ backup:/raid/home/
```

CRON – Schedule Commands (4)

● cron command format – *minute hour day month weekday command*

Field	Description	Range
minute	Minute of the hour	0 ~ 59
hour	Hour of the day	0 ~ 23
day	Day of the month	1 ~ 31
month	Month of the year	1 ~ 12
weekday	Day of the week	0 ~ 6 (0 = Sunday)

● Rule Matching
  ○ * matches everything
  ○ Single character matches exactly
  ○ Dash(-) matches range
  ○ Comma(,) matches any listed value
  ○ Slash(/) matches skips of the number's value through the range.

CRON – Schedule Commands (5)

- crontab time format example

45	10	*	*	1-5	→ AM 10:45, from Mon. to Fri.
10	*	*	*	*	→ On the 10th minute of each hour
*/3	*	*	*	*	→ Every three minutes
30	15	5	*	*	→ PM 3:30 of each 5th day
0	0	14	2	*	→ On the Midnight of Valentine's day
5	0-6	*	*	*	→ On the 5th minute, from 0 to 6 o'clock
0,30	*	13	*	5	→ Every half-hour on Fri. and the 13th day

periodic e.g., 1-59/2 = 1, 3, 5, 7, 9, …, 59

- crontab example

```
20  1  *  *  *          find /tmp -atime +3 -exec rm -f {} ';'
55  23  *  *  0-3,6      /home/tsaimh/cputemp-check.sh
```

CRON – Schedule Commands (6)

● Special strings to specify the time

string	meaning	in 5 fields format
@reboot	Run once, <u>at startup.</u>	N/A
@yearly	Run once a year	0 0 1 1 *
@annually	(same as @yearly)	
@monthly	Run once a month	0 0 1 * *
@weekly	Run once a week	0 0 * * 0
@daily	Run once a day	0 0 * * *
@midnight	(same as @daily)	
@hourly	Run once an hour	0 * * * *
@every_minute	Run once a minute	*/1 * * * *
@every_second	Run once a second	

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crontab command

- crontab(1)

$ crontab -e [-u user]
- Edit the [user's] crontab using editor

$ crontab -l
- List the content of the crontab

$ crontab -r
- Remove the current crontab

$ crontab *filename*
- Install *filename* as your crontab

crontab management (1)

- To Allow or deny user from using cron daemon
  - By default, all users can have their own crontab
  - allow file
    - A list of users that may use crontab, any other not in the list can not use it
  - deny file
    - Reverse meaning
- log

System	Allow or deny file	Log file
FreeBSD	/var/cron/{allow,deny}	By syslogd
Red Hat	/etc/cron.{allow,deny}	/var/log/cron
Solaris	/etc/cron.d/cron.{allow,deny}	/var/cron/log
SunOS	/var/spool/cron/cron.{allow,deny}	By syslogd

System crontab: /etc/crontab

- ## System crontab
  - ### /etc/crontab

```
SHELL=/bin/sh
PATH=/etc:/bin:/sbin:/usr/bin:/usr/sbin
HOME=/var/log
                                    1
#minute hour   mday   month wday   who       command
*/5      *     *      *     *      root      /usr/libexec/atrun
*/11     *     *      *     *      operator  /usr/libexec/save-entropy
0        *     *      *     *      root      newsyslog
1        3     *      *     *      root      periodic daily        2
15       4     *      *     6      root      periodic weekly
30       5     1      *     *      root      periodic monthly
1,31     0-5   *      *     *      root      adjkerntz -a
```

periodic utility (1)

- periodic(8)
  - Run periodic system function under /etc/periodic

```
$ ls -ld /etc/periodic/*
drwxr-xr-x  2 root  wheel  1024 Sep 26 21:43 /etc/periodic/daily
drwxr-xr-x  2 root  wheel   512 Sep 27 03:49 /etc/periodic/monthly
drwxr-xr-x  2 root  wheel   512 Sep 27 03:49 /etc/periodic/security
drwxr-xr-x  2 root  wheel   512 Sep 27 03:49 /etc/periodic/weekly
```

```
$ ls /etc/periodic/daily
100.clean-disks      200.backup-passwd   405.status-ata-raid  430.status-rwho
110.clean-tmps       210.backup-aliases  406.status-gmirror   440.status-mailq
120.clean-preserve   300.calendar        407.status-graid3    450.status-security
130.clean-msgs       310.accounting      408.status-gstripe   470.status-named
140.clean-rwho       330.news            409.status-gconcat   500.queuerun
150.clean-hoststat   400.status-disks    420.status-network   999.local
```

- periodic utility
  - /etc/periodic.conf
  - /etc/defaults/periodic.conf

```
$ ls -al /usr/local/etc/periodic/security
total 18
drwxr-xr-x  2 root  wheel     4 Apr 12  2017 .
drwxr-xr-x  8 root  wheel     8 Aug 20  2016 ..
-r-xr-xr-x  1 root  wheel  4944 Apr  2  2017 410.pkg-audit
-r-xr-xr-x  1 root  wheel  1686 Apr  2  2017 460.pkg-checksum
```

periodic utility (2)

- For custom system programs: /usr/local/etc/periodic

```
$ ls -l /usr/local/etc/periodic/
total 19
drwxr-xr-x  2 root  wheel  6 Apr 12  2017 daily
drwxr-xr-x  2 root  wheel  4 Aug 20  2016 hourly
drwxr-xr-x  2 root  wheel  4 Aug 20  2016 monthly
drwxr-xr-x  2 root  wheel  3 Aug 20  2016 reboot
drwxr-xr-x  2 root  wheel  4 Apr 12  2017 security
drwxr-xr-x  2 root  wheel  6 Apr 12  2017 weekly
```

```
$ ls -l /usr/local/etc/periodic/daily/
total 18
-r-xr-xr-x  1 root  wheel  1512 Jul 29  2016 402.zfSnap
-r-xr-xr-x  1 root  wheel  1073 Jul 29  2016 403.zfSnap_delete
-r-xr-xr-x  1 root  wheel  2746 Apr  2  2017 411.pkg-backup
-r-xr-xr-x  1 root  wheel  2506 Apr  2  2017 490.status-pkg-changes
```

periodic utility (3)

- Execution order depends on filenames
  - Use number as prefix to control the order
- All scripts under that directory will be executed
  - Unlike /etc/rc.conf
  - Even though there is no "YES" in /etc/periodic.conf
- /etc/periodic.conf

```
$ cat /etc/periodic.conf
daily_clean_tmps_enable="YES"                        # Delete stuff daily
daily_clean_tmps_dirs="/tmp /var/tmp"                # Delete under here
daily_clean_tmps_days="3"                            # If not accessed for
daily_status_zfs_enable="YES"                        # Check ZFS
daily_status_ntpd_enable="YES"                        # Check NTP status
weekly_dehydrated_enable="YES"
...
```

- Driven by crontab(1)

at command

- [at(1)](at(1))
  - executes commands at a <u>specified time</u>

    at [-q queue] [-f file] [-mldbv] time

    or at [-q queue] [-f file] [-mldbv] -t [[CC]YY]MMDDhhmm[.SS]

- at management
  - atq: View job queue
  - atrm: Remove jobs
  - /var/at/at.{allow,deny}
    - By default, only root can execute "at" command

- Driven by crontab(1)
  - Invoked every 5 minutes